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Declaration under Rule 4.17:

— of inventorship (Rule 4.17(iv)) for US only

Published:

— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
27 May 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NOVEL VIP3 TOXINS AND METHODS OF USE

(57) Abstract: Novel Vip3 toxins that are highly active against a wide range of lepidopteran insect pests are disclosed. The DNA encoding the Vip3 toxin can be used to transform various prokaryotic and eukaryotic organisms to express the Vip3 toxin. These recombinant organisms can be used to control lepidopteran insects in various environments.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/04735

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A01H 5/00, 5/10; C12N 1/21, 5/04, 15/31, 15/62, 15/82; C07K 14/32, 19/00

US CL : 536/23.4, 23.71; 530/350; 435/419; 800/279, 302

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 536/23.4, 23.71; 530/350; 435/419; 800/279, 302

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98/00546 A2 (MYCOGEN CORPORATION) 08 January 1998 (08.01.1998); See SEQ ID NO:79, claims 40-44, 54-60, pages 5, 17 and 41-43.	1-3, 9, 18, 3748, 91-94 and 99

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

06 February 2004 (06.02.2004)

Date of mailing of the international search report

24 MAR 2004

Name and mailing address of the ISA/US

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Commissioner for Patents

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INTERNATIONAL SEARCH REPORT

PCT/US03/04735

Continuation of B. FIELDS SEARCHED Item3:

Agricola, Biosis, Caplus, CABA, USpat, EPO, IPO, Derwent

Search terms: vip3C, vip3?, toxin

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/04735

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.: 15-17,23,24,61,62 and 76-78
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Please See Continuation Sheet
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1, in part and claims 2-14, 18-22, 32-48, 91-94, 99 and 120

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

Continuation of Box I Reason2:

Claims 15-17, 23-24, 61-62 and 76-78 are unsearchable because they are directed to nucleic acids of SEQ ID NO:11, 32 or 34; however, SEQ ID NO:11, 32 and 34 and amino acid sequences.

Claims 23-24 and 61-62 and 76-78 are unsearchable because they are directed to proteins of SEQ ID NO:12 or 33 or 34; however, SEQ ID NO:11, 32 and 34 and nucleotide sequences..

Claims 76-78 are unsearchable because they are directed to proteins encoded by the nucleic acids of SEQ ID NO:11, 32 or 34; however, SEQ ID NO:11, 32 and 34 and amino acid sequences.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions that are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claim(s) 1, in part, and claims 2-14, 18-22, 32-48, 91-94, 99 and 120, drawn to a nucleic acid that hybridizes to SEQ ID NO:1, vectors, host cells, plants and seeds comprising it, a method of using it to make a toxin and a method of making the transformed plants.

Group II, claim(s) 1, 25 and 81, in part and claim 82, drawn to a nucleic acid comprised in clone C1674 and a toxin encoded by the nucleic acid.

Group II, claim(s) 1, 25 and 81, in part, and claim 83, drawn to a nucleic acid comprised in clone C536 and a toxin encoded by the nucleic acid.

Group III, claim(s) 1, 26 and 84, in part and claims 27 and 85, drawn to a nucleic acid comprised in clone pNOV3910 and a toxin encoded by the nucleic acid.

Group IV, claim(s) 1, 26 and 84, in part and claims 28 and 86, drawn to a nucleic acid comprised in clone pNOV3911 and a toxin encoded by the nucleic acid.

Group V, claim(s) 1, 26 and 84, in part and claims 29 and 87, drawn to a nucleic acid comprised in clone pNOV3906 and a toxin encoded by the nucleic acid.

Group VI, claim(s) 1, 26 and 84, in part and claims 30 and 88, drawn to a nucleic acid comprised in clone pNOV3905 and a toxin encoded by the nucleic acid.

Group VII, claim(s) 1, 26 and 84, in part and claims 31 and 89, drawn to a nucleic acid comprised in clone pNOV3912 and a toxin encoded by the nucleic acid.

Group VIII, claim(s) 49-60, 63-77, 79-80, 90 and 95-98, drawn to a vip3 toxin, compositions comprising it, and a method of using it to control insects.

Group IX, claim(s) 100-119, drawn to a hybrid toxin, nucleic acid encoding it, compositions comprising it, a method of producing it, and a method of using it to control insects.

The inventions listed as Groups I-IX do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: They do not share a special technical feature

The technical feature shared by the Groups is a toxin-encoding nucleic acid that hybridize to SEQ ID NO:1 and toxins encoded by it. This feature is taught by SCHNEPP et al (WO98/00546), who teach such nucleic acids; Claim 1, among others, is not novel. Therefore, the technical feature linking the claims is not special.